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Clinical Significance of BK virus-specific T cell Immunity Monitoring Using ELISPOT Assay in Kidney Transplant Recipients

Ji-yeun CHANG^{1,2}, Ki hyun PARK³, Bum soon CHOI^{1,2}, Cheol whee PARK^{1,2},
Chul woo YANG^{1,2}, Yong-soo KIM^{1,2}, Eun-jee OH³, *Byung ha CHUNG^{1,2}

¹Division of Nephrology, Internal medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea, South, ²Transplant Research Center, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea, South, ³Laboratory Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea, South

Objectives : BK virus (BKV) is an important opportunistic pathogen which can affect allograft outcome. However, suitable parameters to predict the reactivation and the clearance of BKV are still unclear. This study aimed to investigate whether BKV-specific T-cell immunity measured by an interferon- γ enzyme-linked immunosorbent spot (ELISPOT) assay can predict the outcome of BKV infection.

Methods : We included 50 kidney transplant recipients (KTRs) and 44 healthy controls (HCs). BKV-specific CD4+ T-cell responses for Large T (LT), Small T (ST), VP1, VP2, VP3 antigen were measured by using an ELISPOT and BKV-specific IgG antibodies were measured using ELISA method. Cut off value for positivity of ELISPOT was 10 SFU/106 PBMC. KTRs were divided into three groups according to the real-time PCR-determined BKV status: patients who never had viremia, patients with current viremia and patients who recovered from previous viremia. We compared BKV-specific T cell immunity between KTRs and HCs, and we also investigated whether it is associated with the clearance of BKV or the development of BKV-associated nephropathy (BKVN) in KTRs.

Results : All five BKV-specific T cells significantly increased in KTRs compared to HCs. Among KTRs, patients who recovered from previous viremia tended to have higher ELISPOT results for all antigens than the others. And patients who achieved the clearance of the virus during the study period had a higher T-cell immunity compared to patients with persistent viremia ($p < 0.05$). Of 30 cases of allograft biopsies done after the virus reactivation, BKVN comprised of 16.7%. KTRs with BKVN had poorer T-cell responses to LT, ST, VP1 antigen compared to the patients without BKVN ($p < 0.05$). BKV-specific IgG antibodies had no role in this study.

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Conclusions : BKV-specific T cell response measured by ELISPOT may be useful to predict the clearance of viremia and development of BK nephropathy.

Keywords : BKV, ELISPOT